

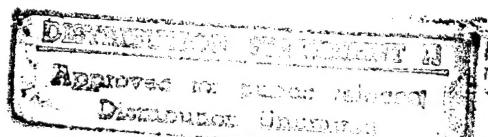
NAVAL WAR COLLEGE  
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**Maximizing Operational Protection in the Face of the Theater Ballistic Missile Threat:  
1996-2006**

by  
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A paper submitted to the Faculty of the Naval War College in partial satisfaction of the requirements of the Joint Military Operations Department.

The contents of this paper reflect my own personal views and are not necessarily endorsed by the Naval War College or the Department of the Navy.



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Abstract of

**MAXIMIZING OPERATIONAL PROTECTION  
IN THE FACE OF THE THEATER BALLISTIC MISSILE THREAT: 1996-2006**

In response to the proliferation of theater ballistic missiles, the U.S. has invested a great deal of technological resources into the development of Theater Ballistic Missile Defense (TBMD) systems. But this technological focus can prove ineffectual if the broader TBMD issues at the operational level of war are not also addressed. TBMD is a vital element of operational protection and contributes to the successful accomplishment of many of the principal components of operational protection.

Since TBMD is a vital element of operational protection, the Joint Force Commander (JFC) must address a number of TBMD issues in order to maximize the operational protection to his forces. These issues include: which forces and facilities should be protected, what multi-mission assets should be allocated to TBMD, and what passive methods are available to maximize force operational protection. These issues are all solved by focusing the TBMD forces on the protection of the center of gravity. Different phases of the operation may cause a shift in the center of gravity and thus a shift in TBMD force deployment.

## **MAXIMIZING OPERATIONAL PROTECTION**

### **IN THE FACE OF THE THEATER BALLISTIC MISSILE THREAT: 1996 - 2006**

During the last ten years, much of the world's military technology resources has been aimed at the development of theater ballistic missile (TBM) programs. TBMs are being developed, bought, and deployed around the world, in the inventories of potentially hostile countries like China, North Korea, Iran, Iraq, and Libya.<sup>1</sup> More than 30 countries now possess these potent weapons. From just seven countries in 1991, today thirteen countries have fielded TBMs with estimated ranges in excess of 500 km.<sup>2</sup> This threat is increasingly becoming more potent with improvements in missile range and the coupling with weapons of mass destruction (WMD). North Korea is developing at least three types of TBMs including the 1,000 km Nodong-1, the 2,000 km Taepo Dong-1, and the 3,500 km two stage Taepo Dong-2. Ranges of this magnitude will place at risk U.S. forces in Japan and as far away as Guam.<sup>3</sup> In response to this potent threat, the United States continues to invest a great deal of financial resources and effort in the development of Theater Ballistic Missile Defense (TBMD) weapon systems. The development of these high tech TBMD systems has been the focus and subject matter for a great deal of professional writing and discussion. **But this technological focus can prove ineffectual if the broader TBMD issues at the operational level of war are not also addressed.**

Operational protection is one of the operational functions which enables a theater commander to directly influence the outcome of a campaign or major operation. It is defined by Professor Milan Vego of the U.S. Naval War College as, "all of the actions and measures

taken to counter the enemy's firepower and operational maneuver to make one's own and friendly forces and assets difficult for the opponent to locate, strike, and destroy.<sup>4</sup> Some of its principal theater-wide components include:

- air defense
- protection of major formations and forces
- protection of operational logistics elements
- protection of military dependents and other noncombatants
- nuclear, biological, chemical (NBC) defense
- operational deception (OPDEC)
- operations security (OPSEC)<sup>5</sup>

**TBMD is a vital element of operational protection and contributes to the successful accomplishment of many of the principal components of operational protection.** It is a subset of Theater Missile Defense (TMD) which in turn is a subset of Theater Air Defense (TAD), one of the principal components of operational protection.<sup>6</sup> Its objective is the protection of friendly and allied forces, including population centers, from the threat of ballistic missiles.<sup>7</sup> TBMD also plays a vital role in the active defense against WMD and the passive defense efforts to combat NBC contamination.

TBMD is not an end in itself. It is one mission designed to ensure the operational protection of forward deployed and expeditionary forces in the midst of a TBM threat, so that these forces may pursue other missions which will achieve operational and strategic goals. Thus the ultimate measure of TBMD success is not in the number of Scud missiles destroyed, but rather in the achievement of operational and strategic objectives. Having described TBMD as an element of operational protection, the rest of the paper will present those operational issues that the Joint Force Commander (JFC) must concern himself with in order to maximize his operational protection in the face of a TBM threat. Specifically:

- 1) Which forces and facilities should be protected?**
- 2) What assets should be allocated to TBMD in order to maximize overall operational protection?**
- 3) When TBMD defensive assets are insufficient to defend all forces and facilities, what other methods does the JFC have at his disposal to maximize operational protection?**

### **THE DEFENDED ASSETS LIST**

The most difficult and most important TBMD issue that the JFC must resolve is: which forces and facilities should be protected? For the purpose of this paper, protection of a force or facility implies active defense, those operations initiated to protect against a TBM attack by destroying the TBM in flight.<sup>8</sup> There is no joint doctrine or concept of operations which will answer this question for the JFC. Joint Publication 3-01.5, the Doctrine for Theater Missile Defense, tasks the JFC with prioritizing the friendly assets which must be protected by active defense.<sup>9</sup> It further specifies that this prioritization include U.S., allied, and coalition forces; critical assets; and areas of vital interest or political importance.<sup>10</sup> More specifically, the JFC should consider the active defense of military forces (U.S., allied, and coalition), ports of entry, air bases, command and control facilities, ammunition dumps, POL storage sites, power and water plants, amphibious objective areas (AOA), troop encampments (U.S., allied, and coalition), civilian population centers, government facilities, critical economic assets, and out-of-theater allies and countries where the U.S. has bases.<sup>11</sup> When applying this list to any conceivable theater of operations, the result will surely be an extensive list of possible targets

for the enemy TBMs.

The next task for the JFC, in deciding which TBM targets will be defended, is to determine what active defense TBMD forces are assigned to his Joint Task Force (JTF) or could be requested from higher authority. This is a relatively simple, but important task. During the next ten years, the answer to this task will most certainly be, "not many TBMD forces are available." The reason for this is that there is currently only one TBMD asset in service, the Patriot Advanced Capability - 2 (PAC-2), a short range point-defense endo-atmospheric missile. In future years, new TBMD systems will be fielded which will provide the JFC with additional active defense options. I will briefly digress in order to describe the time line for future TBMD asset deployment.

Patriot, PAC-3, will be fielded in 1998 and will increase by tenfold PAC-2's coverage area.<sup>12</sup> Also in 1998, a contingency capability of two Navy Area Defense (NAD) Aegis cruisers with at least 35 SM-2 Block IVA missiles will be in service. This lower-tier system will provide an area defense capability with engagements up to 120 km in range and 35 km in altitude. By 2005, the majority of the Aegis fleet will be NAD capable.<sup>13</sup> The Theater High Altitude Air Defense (THAAD) missile, the first exo-atmospheric upper-tier system, will be deployed in 2001.<sup>14</sup> It will be capable of endo and exo-atmospheric intercepts and have a 160 km range.<sup>15</sup> One final system which is currently unfunded, but has excellent potential and significant backing, is the Navy Theater Wide (NTW) system. The SM-2 Block IVA missile would be modified with a Lightweight Exo-Atmospheric Projectile (LEAP) or a THAAD hit-to-kill vehicle in order to provide a very long range, extremely high altitude missile with the capability to conduct ascent-phase intercepts.<sup>16</sup> This ascent-phase intercept capability would

allow Aegis ships to have defended footprints of tens of thousands of square miles.

Thus, for most of the next ten years, U.S. TBMD assets will be quite limited. They will consist of the Patriot missile system (PAC-2 and PAC-3) supplemented by high capability, but limited numbers of NAD and THAAD missile systems. During the next ten years, the number of assets to be defended will greatly outnumber the TBMD assets available to the JFC. Even when all U.S. TBMD systems are operational at some time in the future (estimate 2020), the number of assets to be protected will almost always exceed active defense assets due to the extensive list of enemy TBM targets. Thus, **the JFC will never have sufficient active defense assets to protect all possible TBM targets.** The JFC will always have to make difficult choices when selecting which forces and facilities to protect. Using the technical jargon, which forces and facilities to place on the Defended Assets List (DAL). **In order to maximize his force's operational protection by assigning the appropriate protected assets to the DAL, the JFC must conduct Intelligence Preparation of the Battlefield (IPB), consider the potential for use of WMD, and determine his own center of gravity in all phases of the operation.**

Intelligence Preparation of the Battlefield (IPB) should play a major role in assisting the JFC in determining which assets will be actively defended against TBM attack. If the JFC's intelligence staff can determine the adversary TBM's accuracy of guidance system, warhead type and maximum range and the adversary's reconnaissance capability, the TBM's capability against different types of targets can be determined. Most TBM guidance systems are not exceptionally accurate and therefore can not effectively hit smaller, individual targets, thus allowing these targets to remain undefended against TBMs while still maintaining a high

probability of survival. But if the accuracy is able to achieve a 50 meter Circular Error Probable (CEP), TBMs will be able to target and hit specific piers in a port, hangars on an airfield or buildings on a base, thus requiring active defense to ensure protection.<sup>17</sup> Similarly, if the warhead type can be determined to be of a conventional nature, the TBM threat is much diminished from that of a WMD warhead. Unless TBMs are exceptionally accurate, conventionally armed TBMs are more of a nuisance than a threat to a trained military force.<sup>18</sup>

A third use of IPB occurs when intelligence estimates are able to determine the maximum range of the adversary TBMs. The operational protection of critical friendly forces and assets can then be ensured by placing them out of range. Due to the trend of increasingly long TBM ranges, placing critical assets out of the TBM's range may soon become untenable. Finally, estimation of an adversary's reconnaissance capabilities can play a significant role in the determination as to whether critical, mobile friendly assets require active defense against TBMs. Without capable satellite, air, or human reconnaissance, mobile assets will not be able to be effectively targeted.

The potential for use of WMD will have an immense effect upon the JFC's choice of assets which he will protect with his limited TBMD forces. The advantage gained through determination of the TBM guidance system accuracy previously discussed, would be immediately lost since even inaccurate missiles with WMD warheads would cause significant damage to military forces or the civilian population. Secondly, the JFC must make the protection of civilian population centers the highest priority for TBMD, since a successful NBC attack against the indigenous population with the ensuing massive casualties could strategically lose the war by defeating the will of the people or by disrupting the U.S. - host

nation alliance. The catastrophic results from a WMD delivered to a population center would be so disastrous, that even a 90% TBMD success rate would not be good enough.<sup>19</sup> Since force dispersal is imperative under the threat of a nuclear attack, the JFC will in effect create a larger number of targets for the enemy and thus leave a larger number of his forces unprotected from the TBM threat. Due to the inability to defend the number of targets which could be attacked by the TBM - WMD threat and the distinct possibility of collateral damage from the WMD even after successful intercept, TBMD may well prove ineffective against this threat. The JFC's ability to provide operational protection will come from deterrence, the fear of U.S. nuclear retaliation. **The most important method that the JFC will have in prioritizing the forces and facilities which will be protected from TBM attack is through the determination and protection of his own center of gravity during all phases of the operation.** The center of gravity may vary with the operational phase, but TBMD assets must always defend this center of gravity despite the risk to lower priority assets.<sup>20</sup> The three operational phases which will be considered are:

- 1) Defensive operations to halt an invasion
- 2) The build-up of combat power in the region
- 3) Offensive operations to defeat the enemy<sup>21</sup>

During the defensive operations phase, the probability of having significant TBMD assets in theater may be small since ground based TBMD forces take weeks to deploy. It took the first Patriot battalion 34 days to arrive in Saudi Arabia during Desert Shield.<sup>22</sup> Naval NAD assets may be in theater, but their operational reach will be limited by their 120 km range from the sea. The center of gravity during this phase will be the defensive force itself. The JFC should

assign critical defensive forces and fortifications to the top of the DAL. During the second phase, when combat power is being built up in the region, there will be two critical centers of gravity, one at the operational level and one at the strategic level. At the operational level, the center of gravity is the lodgment areas where U.S. forces and supplies are arriving in theater. These ports, airfields, and possibly amphibious objective areas are vital to the operation. The entire operation could fail if enemy TBM systems overwhelm the defenses and make the lodgment areas untenable.<sup>23</sup> Thus, the JFC must make these facilities the priority of the DAL. At the strategic level there is a political center of gravity, the cohesion of the U.S. led coalition. If it takes a number of months for a build-up, protecting the cohesion of the coalition is an extremely important priority.<sup>24</sup> This center of gravity will undoubtedly require TBMD assets. The proportioning of TBMD assets between these two centers of gravity will require great skill and undoubtedly be a contentious issue. Considering the TBMD forces required to protect these two centers of gravity, there will almost assuredly be no TBMD protection remaining for other enemy targets. During the third phase, the shift to offensive operations, the center of gravity will be the offensive forces. Thus, the JFC must again shift his priorities on the DAL to support these forces. **In sum, the key to maximizing operational protection afforded by TBMD is the shifting of protected assets in the DAL during the various phases of operation to conform with the JFC's shifting center of gravity.**

## **NAVAL AND AIR FORCE CONFLICTING OPERATIONAL REQUIREMENTS**

A second issue that the JFC must concern himself with in order to maximize his operational protection in the face of a TBM threat is the determination of which assets should be allocated to TBMD. Up to now, the scope of the paper has been limited to one pillar of TBMD, active defense. This question of asset allocation must also consider a second pillar of TBMD, attack operations. Joint Publication 3-01.5, the Doctrine for Joint Theater Missile Defense defines attack operations as offensive actions intended to destroy and disrupt enemy TBM capabilities before, during, and after launch.<sup>25</sup> The objective of this counter-TBM portion of the air campaign is to delay, disrupt, and destroy enemy TBM operations through preemptive attacks.<sup>26</sup> This issue is not applicable to Army active defense forces such as Patriot and THAAD since they are always dedicated to TBMD. But for naval and air forces, the same platforms that conduct TBMD active defense and TBMD attack operations also conduct many other offensive and defensive missions.

Aegis cruisers and destroyers, the platforms upon which NAD and NTW TBMD systems will be deployed, are multi-mission ships which perform numerous other functions than TBMD. Some of these missions include escort operations, strike operations, maritime interception operations, and naval surface fire support. In the conduct of these missions, these sophisticated surface combatants perform fundamental warfare tasks such as anti-air warfare and anti-submarine warfare. By assigning a NAD ship to a TBMD mission, it will often preclude conduct of other missions which would require a different geographic positioning. Two missions that will almost always conflict will be TBMD and offensive Tomahawk strike operations since both require the ship to be in restrictive missile launch baskets. Additionally,

the Aegis cruisers and destroyers are the principal units which provide operational protection to aircraft carriers. Thus the JFC is faced with a trade-off between operational protection against TBMs or operational protection of the fleet. The probable solution to this trade-off lies in the evaluation of the relative threat to naval forces and as to whether a maritime or land campaign is being waged.

The JFC also faces an asset allocation decision when assigning targets to Air Force missions. Air Force tactical aircraft are also multi-mission units. They perform missions such as deep strike, interdiction, close air support and combat air patrol. Flying TBMD attack operation sorties against launch platforms, support facilities and missile stocks takes away sorties in support of other mission areas. Thus, the JFC must apply a methodology for allocating Air Force assets to TBMD attack operations. Again, protection of the center of gravity appears to provide the best solution. During the defensive and offensive phases discussed earlier, Air Force sorties should support the defensive and offensive forces, the centers of gravity. Few sorties will be available for TBMD attack operations during these two phases. But during the build-up of combat power phase, Air Force assets should be shifted toward support of TBMD attack operations in order to protect the operational center of gravity, the lodgment areas, and the strategic center of gravity, the coalition. These sorties will work in concert with the TBMD active defense units to protect the centers of gravity during this critical phase.

### **THE THIRD PILLAR OF TBMD: PASSIVE DEFENSE**

The third issue that the JFC must concern himself with in order to maximize operational protection in a TBM environment is: what other methods does the JFC have at his disposal to maximize operational protection when TBMD defensive assets are insufficient? The answer to this question is provided by the third pillar of TBMD, passive defense. Passive defenses are the measures initiated to reduce vulnerability and to minimize the effects of damage caused by TBM attack. These measures should always be used regardless of active defense or attack operational success. Passive defense measures include TBM early warning, NBC protection, operational security, counter surveillance, deception, camouflage and concealment, target hardening, electronic warfare, mobility, dispersal, redundancy, recovery, and reconstitution.<sup>27</sup> These measures can also apply to civilian targets such as population centers, airports, and power plants.<sup>28</sup> It is essential that timely TBM early warning be provided to civilian populations in order to support the civil passive defense capability and assure coalition unity. Finally, two of the most important military passive defense measures which deserve extra emphasis are mobility and dispersal, since TBMs require stationary, concentrated targets.

### **CONCLUSION**

In conclusion, it must be reemphasized that TBMD is not an end in and of itself, but rather a mission designed to ensure the operational protection of forward deployed and expeditionary forces in the midst of a TBM threat, so that these forces may pursue other missions which will achieve operational and strategic goals. In order to maximize his force's operational protection by assigning the appropriate protected assets to the Defended Assets List, the JFC

must conduct IPB, consider the potential for use of WMD, and most importantly determine his own center of gravity in all phases of the operations. By focusing the three pillars of TBMD; active defense, passive defense and attack operations, on his own center of gravity, the JFC will maximize the operational protection of his assigned forces.

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